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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/632,568

08/02/2003

Marcos Kamezos

CPAC 1017-3

2603

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08/10/2005

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EXAMINER

MENZ, DOUGLAS M

ART UNIT

PAPER NUMBER

2891

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/632,568

Applicant(s)

KARNEZOS, MARCOS

Examiner

Douglas M. Menz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 14-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/11/05, 5/17/05, 5/16/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Massit et al. (US 5373189).

Regarding claim 1, Massit discloses a multipackage module having a second package (4c) stacked over a first package (4b), each said package comprising a die (10c and 10b, respectively) attached to a substrate (6c and 6b, respectively), the second package substrate (6c) and the first package substrate (6b) being interconnected by wire bonding (13c), wherein the first package comprises a ball grid array package (10b with 11b, Fig. 1 and Cols. 4-5).

Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Takiar et al. (US 5495398).

Regarding claim 1, Takiar discloses a multipackage module having a second package [(136 and 142, Fig. 7), (216 and 214, Fig. 11), (264 and 262, Fig. 14)] stacked

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over a first package [(138 and 140, Fig. 7), (212 and 218, Fig. 11), (260 and 268, Fig. 14)], each said package comprising a die [(140 and 136, Fig. 7), (216 and 212, Fig. 11), (264 and 260, Fig. 14)] attached to a substrate [(138 and 142, Fig. 7), (214 and 218, Fig. 11), (262 and 268, Fig. 14)], the second package substrate and the first package substrate being interconnected by wire bonding, wherein the first package comprises a ball grid array package (Figs. 1, 7, 11, 14 and Col. 4, lines: 35-65 and Col. 7, lines: 22-40 and Col. 9).

Regarding claim 2, Takiar further discloses wherein at least one said package has wire bond interconnect of the die with the substrate, and the said wire bonded package is at least partly encapsulated (25, Fig. 1 and Col. 10, lines: 32-44).

Regarding claim 3, Takiar further disclose wherein the second package has wire bond interconnect of the die (264) with the substrate (262, Fig. 14 and Cols. 9-10).

Regarding claim 4, Takiar further discloses wherein the second package is fully encapsulated (25, Fig. 1 and Col. 10, lines: 32-44).

Regarding claim 5, Takiar further discloses wherein the second package is encapsulated to an extent sufficient to protect wire bonds between the die and the substrate (25, Fig. 1 and Col. 10, lines: 32-44)..

Regarding claim 6, Takiar further discloses wherein the second package is a land grid array package (Cols. 4,5 and 7).

Regarding claim 7, Takiar further discloses wherein the land grid array package substrate is a single-metal layer substrate (Col. 4, lines: 46-65 and Col. 9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takiar et al. (US 5495398) in view of Chen et al. (US 6472741)

Regarding claim 8, Takiar discloses the structure of claim 1 as mentioned above, however, Takiar does not disclose a heat spreader having a generally planar upper surface exposed at the top of the module. Chen discloses a similar stacked package arrangement, which incorporates a heat spreader (370) having a generally planar upper surface exposed at the top of the module (Fig. 7 and Col. 5, lines: 10-25). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Chen's heat spreader into Takiar's structure for the purpose of cooling the

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semiconductor package as this was commonly done so in the art at the time of the invention.

Regarding claim 9, Chen further discloses wherein a planar part of the heat spreader (370) is supported by support members (371) over the first package substrate (Fig. 7 and Col. 5, lines: 10-25).

Regarding claim 10, Chen further disclose wherein a planar part of the heat spreader (370) is affixed onto an upper surface of the second package (Fig. 7, and Col. 5, lines: 10-25).

Regarding claims 11-13, Takiar discloses the structure of claim 1 as mentioned above and Chen disclose the structure which incorporates a metal heat spreader (370 and 330, Fig. 7) which encompasses the first and second packages, respectively. It would have been obvious to one of ordinary skill in the art at the time of the invention to realize the heat spreader structure taught by Chen as an electromagnetic shield for at the packages since it is composed of metal.

Regarding claim 13, Chen discloses the second package is affixed onto an upper surface of the heat spreader (330, Fig. 7) which correlates to the electromagnetic shield as discussed above.

Response to Arguments

Applicant's arguments filed 5/16/05 have been fully considered but they are not persuasive. Applicant argues that Massit discloses "flip chip" interconnection and not a ball grid array. Firstly, the examiner points out that the limitation in question is as follows: "wherein the first package comprises a ball grid array package". Therefore, any arguments relating to limitations that are not claimed are not found persuasive. Next, a ball grid array is merely an attachment structure which incorporates conductive balls to attach two elements such as substrate to substrate, chip to substrate or chip to chip. Massit does disclose "flip chip" bonding which incorporates the use of solder balls, therefore, Massit discloses the limitation "wherein the first package comprises a ball grid array package". This interpretation of ball grid array structures is commonly known in the art of semiconductor technology. As evidence to support such teachings, but not relied upon for the rejection, please see the background section Col. 1, line: 50 – Col. 2, line: 15 of Quek et al. (US 6492726).

Applicant also argues that there is no suggestion to combine the Chen reference with the Takiar reference. The Chen reference discloses the heat spreader. Heat dissipation is a concern with all semiconductor devices. Therefore, one of ordinary skill in the art would have the motivation to combine the teachings of a heat spreader into a semiconductor device.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

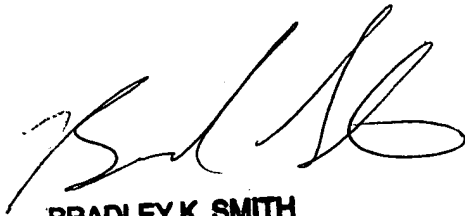
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas M. Menz whose telephone number is 571-272-1877. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DM



BRADLEY K. SMITH
PRIMARY EXAMINER